ATTACHMENT A

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<110> APPLICANT: Better, Marc D.
      Horwitz, Arnold H.
<120> TITLE OF INVENTION: Human Engineered to Antibodies to Ep-CAM
<130> FILE REFERENCE: 14923US02
<140> CURRENT APPLICATION NUMBER: US/10/816.276
<141> CURRENT FILING DATE: 2004-03-31
<150> PRIOR APPLICATION NUMBER: 60/459,334
<151> PRIOR FILING DATE: 2003-03-31
<160> NUMBER OF SEQ ID NOS: 59
<170> SOFTWARE: PatentIn version 3.2
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      Val Thr Pro Gly Glu Pro Gly Ser Ile Ser Cys Arg Ser Ser Lys Ser
      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
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      Ser Gly Val Pro Asp Arg Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
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      Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
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      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
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      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
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      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
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      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
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                                   180
                                                        185
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                      -15
                                           -10
      qcc caa qca caq atc cag ttg gtg cag tct gga cct gag gtg aag aag
                                                                             96
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              -1 1
      cet gga gag tee gte aag ate tee tge aag get tet gga tat ace tte
                                                                            144
      Pro Gly Glu Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
                              20
                                                                            192
      aca aaa tat gga atg aac tgg gtg aag cag gct cca gga cag ggt tta
      Thr Lys Tyr Gly Met Asn Trp Val Lys Gln Ala Pro Gly Gln Gly Leu
                          35
                                              40
      aag tgg atg ggc tgg ata aac acc tac act gaa gag cca aca tat ggt
                                                                            240
      Lys Trp Met Gly Trp Ile Asn Thr Tyr Thr Glu Glu Pro Thr Tyr Gly
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      gat gac ttc aag gga cgg ttt acc ttc acc ttg gac acc tct act agc
                                                                            288
      Asp Asp Phe Lys Gly Arg Phe Thr Phe Thr Leu Asp Thr Ser Thr Ser
                                       70
                                                                            336
      act qcc tat ttq qaa atc tct tct ctc cgg agt gag gac acg gct aca
      Thr Ala Tyr Leu Glu Ile Ser Ser Leu Arg Ser Glu Asp Thr Ala Thr
              80
      tat ttc tqt qca aqa ttt ggc tct gct gtg gac tac tgg ggt caa gga
                                                                            384
      Tyr Phe Cys Ala Arg Phe Gly Ser Ala Val Asp Tyr Trp Gly Gln Gly
                               100
                                                   105
      ace ttg gtc ace gtc tcc tca gcc agc aca aag ggc cca tcg gtc ttc
                                                                            432
      Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
                                               120
                           115
      ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg
                                                                            480
      Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
                                           135
                      130
                                                                            528
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      Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
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      aac toa ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta
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Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu

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						Ser 180										624
						acc Thr										672
						aag Lys										720
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			ctc			cca Pro		ccc					atg			816
		cct				tgc Cys 260	gtg					agc				864
	gag					tgg Trp					gtg					912
gcc					cgg	gag Glu				aac					gtg	960
				acc		ctg Leu			gac					aag		1008
						aac Asn										1056
						999 Gly 340										1104
						g a g Glu										1152
						tat Tyr										1200
						aac Asn										1248
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                                          -10
                                                                             96
      gcc caa gca cag atc cag ttg gtg cag tct gga gct gag gtg aag aag
      Ala Gln Ala Gln Ile Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
              -1 1
      cet gga gag tea gte aag ate tee tge aag get tet gga tat ace tte
                                                                            144
      Pro Gly Glu Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
                                                                            192
      aca aaa tat gga atg aac tgg gtg cga cag gct cca gga caa ggt tta
      Thr Lys Tyr Gly Met Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
                          35
                                               40
      gag tgg atg ggc tgg ata aac acc tac act gaa gag cca aca tat ggt
                                                                            240
      Glu Trp Met Gly Trp Ile Asn Thr Tyr Thr Glu Glu Pro Thr Tyr Gly
                                          55
      cag aag ttc cag gga cgg ttt acc ttc acc ttg gac acc tct act agc
                                                                            288
      Gln Lys Phe Gln Gly Arg Phe Thr Phe Thr Leu Asp Thr Ser Thr Ser
                  65
                                      70
                                                                            336
      act qcc tat ttq qaa atc tct tcq ctc cgg agt gag gac acg gct gtg
      Thr Ala Tyr Leu Glu Ile Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
              80
                                   85
      tat ttc tgt gca aga ttt ggc tct gct gtg gac tac tgg ggt caa gga
                                                                            384
      Tyr Phe Cys Ala Arg Phe Gly Ser Ala Val Asp Tyr Trp Gly Gln Gly
                              100
                                                   105
      acc ttg gtc acc gtc tcc tca gcc agc aca aag ggc cca tcg gtc ttc
                                                                            432
      Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
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                          115
      ccc ctq qca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg
                                                                            480
      Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
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                      130
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                                                                            528
      Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
                                      150
                                                          155
      aac toa qqc qcc ctq acc agc ggc gtg cac acc ttc ccg gct gtc cta
                                                                            576
      Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
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                                                       170
              160
                                                                            624
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	Ser															
190			1		195		-2-		-1	200				-	205	
								~++	~~~			+ a+	tat	~~~		720
	aac															/20
Ser	Asn	Thr	ьуs		Asp	ьуs	Arg	Val		Pro	гÀг	ser	Cys		гĀв	
				210					215					220		
act	cac	aca	tgc	cca	ccg	tgc	cca	gca	cct	gaa	ctc	ctg	ggg	gga	ccg	768
Thr	His	Thr	Cvs	Pro	Pro	Cvs	Pro	Ala	Pro	Glu	Leu	Leu	Gly	Gly	Pro	
			225			- 2		230					235	-		
+ 42	gtc	++0		tta	ccc	cca	222		220	aac	200	ctc		atc	tcc	816
																010
ser	Val		Leu	Phe	Pro	Pro		PIO	гуя	Asp	IIII		Met	TIE	ser	
		240					245					250				
cgg	acc	cct	gag	gtc	aca	tgc	gtg	gtg	gtg	gac	gtg	agc	cac	gaa	gac	864
Arg	Thr	Pro	Glu	Val	Thr	Cys	Val	Val	Val	Asp	Val	Ser	His	Glu	Asp	
	255					260					265					
cct	gag	atc	aag	ttc	aac	taa	tac	ata	gac	aac	ata	gag	ata	cat	aat	912
	Glu															
	GIU	Val	Бур	FIIC	275	ııp	TYT	Val	мър	280	val	Oru	var	1110	285	
270																
	aag															960
Ala	Lys	Thr	Lys	Pro	Arg	Glu	Glu	Gln		Asn	Ser	Thr	Tyr		Val	
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	Ser															
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+ > 0	aag	tac		ata	taa	220	999		ctc	002	acc	ccc		gag	222	1056
																1050
Tyr	Lys		гув	vaı	ser	ASII		ALA	Leu	PIO	Ald		TTE	GIU	гув	
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Thr	Ile	Ser	Lys	Ala	Lys	Gly	Gln	Pro	Arg	Glu	Pro	Gln	Val	Tyr	Thr	
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cta	CCC	cca	t.cc	caa	gat	gag	cta	acc	aaq	aac	caq	atc	agc	cta	acc	1152
	Pro															
350	FIO	FIO	DCI	Arg	355	OIU	LCu	1111	275	360	01				365	
	ctg															1200
Cys	Leu	Val	Lys	Gly	Phe	Tyr	Pro	ser	Asp	Ile	Ala	Val	Glu		Glu	
				370					375					380		
age	aat	qqq	caq	ccq	gag	aac	aac	tac	aag	acc	acg	cct	CCC	gtg	ctg	1248
	Asn															
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~~~	tcc	~~~		+	++0	tto	ata		200	220	ata	300		ana	220	1296
																1250
Asp	Ser		GIA	ser	Pne	Pne		Tyr	ser	гув	Leu		val	Asp	гув	
		400					405					410				
	agg															1344
Ser	Arq	Trp	Gln	Gln	Gly	Asn	Val	Phe	ser	Cys	Ser	Val	Met	His	Glu	
	415	-				420					425					
act	ctg	cac	aac	cac	tac	acq	cag	aag	age	ctc	tcc	cta	tet	cca	aat.	1392
	Leu															2570
	ne a	urs	nsii	urs		TILL	3111	nys	261		261	пеп	261	FIO	445	
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Lys																

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	gga tee act gea gae ate gtg atg ace eag tet eea ete tee aat eea	20
	Gly Ser Thr Ala Asp Ile Val Met Thr Gln Ser Pro Leu Ser Asn Pro	
		144

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Val Thr Leu Gly Glu Ser Gly Ser Ile Ser Cys Arg Ser Ser Lys Ser
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      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
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      cca ggg cag tot cot cag ctg ctc atc tat cag atg tot aac aga gcc
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      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
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      tca ggg gtc cca gac agg ttc agt agc agt gga tct ggg aca gat ttc
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      Ser Gly Val Pro Asp Arq Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
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      act ctc aag atc agc aga gtg gag gct gaa gat gtg gga gtt tat tac
                                                                            336
      Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
                                      85
      tgt get cag aac eta gag ett eeg egg aeg tte ggt cag gge aec aag
                                                                            384
      Cys Ala Gln Asn Leu Glu Leu Pro Arq Thr Phe Gly Gln Gly Thr Lys
                                  100
      ctt gag atg aaa ega act gtg gct gca cca tet gte tte ate tte ceg
                                                                            432
      Leu Glu Met Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
                              115
                                                   120
      cca tct gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg
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      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
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      ctg aat aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat
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      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
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                                          150
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      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
                  160
                                      165
      age aag gac age age tac age etc age age age etg agg etg age aaa
                                                                            624
      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
              175
                                  180
      qca qac tac qaq aaa cac aaa qtc tac qcc tqc qaa qtc acc cat caq
                                                                            672
      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
                              195
                                                  200
      ggc ctg agc tcg ccc gtc aca aag agc ttc aac agg gga gag tgt tag
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Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr

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80
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      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
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                                                       105
      Leu Glu Met Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
                              115
                                                   120
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
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                                               135
      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
                                           150
      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
                                      165
      Ser Lvs Asp Ser Thr Tvr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lvs
                                  180
      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
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                                                   200
      Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
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      -20
                          -15
                                               -10
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      Gly Ser Thr Ala Asp Ile Val Met Thr Gln Ser Ala Leu Ser Asn Pro
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                                                                            144
      Val Thr Pro Gly Glu Ser Gly Ser Ile Ser Cys Arg Ser Ser Lys Ser
      ctc cta cat agt aat ggc atc act tat ttg tat tgg tat ctg cag aaa
                                                                            192
      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
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      cca ggg cag tot cot cag otg ctc atc tat cag atg tot aac aga gcc
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      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
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      tca qqq qtc cca qac aqq ttc aqt aqc aqt qqa tct ggg aca gat ttc
                                                                            288
      Ser Gly Val Pro Asp Arg Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
                      65
                                          70
                                                                            336
      act ctc aag atc agc aga gtg gag gct gaa gat gtg gga gtt tat tac
      Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
                                      85
      tgt gct cag aac cta gag ctt ccg cgg acg ttc ggt cag ggc acc aag
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      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
                                  100
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ctt gag atg aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg
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      cca tct gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg
                                                                            480
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
                          130
                                               135
      ctg aat aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat
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      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
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                                          150
      aac gcc ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac
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      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
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                                      165
      age aag gac age ace tac age etc age age ace etg aeg etg age aaa
                                                                            624
      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
                                  180
      gca gac tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag
                                                                            672
      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
                              195
                                                  200
      gge etg age teg eee gte aca aag age tte aac agg gga gag tgt tag
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      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
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      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
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      Ser Gly Val Pro Asp Arg Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
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      Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
                                  100
      Leu Glu Met Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
                              115
                                                  120
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
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                                              135
     Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
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                                          150
     Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
                                      165
     Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
                                  180
     Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
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     Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
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      -20
                          -15
                                               -10
      gga tec act gea gae ate gtg atg ace eag tet gea ete tee aat eea
                                                                             96
      Gly Ser Thr Ala Asp Ile Val Met Thr Gln Ser Ala Leu Ser Asn Pro
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      gtc act ctg gga gag ccg ggt tcc atc tcc tgc cgg tct agt aag agt
      Val Thr Leu Gly Glu Pro Gly Ser Ile Ser Cys Arg Ser Ser Lys Ser
                                  20
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      ctc cta cat agt aat ggc atc act tat ttg tat tgg tat ctg cag aaa
      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
                              35
      cca ggg cag tot cct cag ctg ctc atc tat cag atg tot aac aga gcc
                                                                            240
      Pro Glv Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
      tea ggg gtc eca gac agg ttc agt agc agt gga tct ggg aca gat ttc
                                                                            288
      Ser Gly Val Pro Asp Arg Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
                      65
      act ctc aag atc agc aga gtg gag gct gaa gat gtg gga gtt tat tac
                                                                            336
      Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
                                      85
      tqt qct cag aac cta gag ctt ccg cgg acg ttc ggt cag ggc acc aag
                                                                            384
      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
                                  100
      ctt gag atg aaa ega act gtg get gea eea tet gte tte ate tte eeg
                                                                            432
      Leu Glu Met Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
          110
                              115
                                                                            480
      cca tot gat gag cag ttg aaa tot gga act gcc tot gtt gtg tgc ctg
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
                          130
                                               135
      ctg aat aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat
                                                                            528
      Leu Asn Asn Phe Tyr Pro Arq Glu Ala Lys Val Gln Trp Lys Val Asp
                      145
                                           150
                                                                            576
      aac gcc ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac
      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
                                      165
      age aag gac age ace tac age etc age age ace etg aeg etg age aaa
                                                                            624
      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
                                  180
                                                       185
      gca gac tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag
                                                                            672
      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
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      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
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                                               55
      Ser Gly Val Pro Asp Arg Phe Ser Ser Gly Ser Gly Thr Asp Phe
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      Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
                                      85
      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
                                  100
                                                       105
      Leu Glu Met Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
                              115
                                                  120
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
                          130
                                               135
      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
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      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
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                                      165
                                                           170
      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
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      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
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                              195
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                                               -10
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      Gly Ser Thr Ala Asp Ile Val Met Thr Gln Ser Pro Leu Ser Asn Pro
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                                                                            144
      Val Thr Pro Gly Glu Ser Gly Ser Ile Ser Cys Arg Ser Ser Lys Ser
      ctc cta cat agt aat ggc atc act tat ttg tat tgg tat ctg cag aaa
                                                                            192
      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
                              35
      cca ggg cag tot cot cag etg etc atc tat cag atg tot aac aga gcc
                                                                            240
      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
                          50
                                              55
      tea ggg gte eea gae agg tte agt age agt gga tet ggg aca gat tte
                                                                            288
      Ser Gly Val Pro Asp Arg Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
      act ctc aag atc agc aga gtg gag gct gaa gat gtg gga gtt tat tac
                                                                            336
      Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
                                       85
      tgt get cag aac eta gag ett eeg egg aeg tte ggt eag gge aec aag
                                                                            384
      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
                                  100
      ctt gag atg aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg
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      Leu Glu Met Lys Arq Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
                              115
                                                  120
      cca tct gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg
                                                                            480
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
                          130
                                              135
      ctg aat aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat
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      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
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                                          150
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      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
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                                      165
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                                                                            624
      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
                                  180
      gca gac tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag
                                                                            672
      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
                              195
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-1 1

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      Thr Leu Lys Ile Ser Arq Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
                                  100
      Leu Glu Met Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
                              115
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
                          130
      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
                      145
                                          150
      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
                                      165
      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
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                                                      185
      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
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      Gly Ser Thr Ala Asp Ile Val Met Thr Gln Ser Pro Leu Ser Asn Pro
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                                                                            144
      Val Thr Leu Gly Glu Pro Gly Ser Ile Ser Cys Arg Ser Ser Lys Ser
                                  20
      ctc cta cat agt aat ggc atc act tat ttg tat tgg tat ctg cag aaa
                                                                            192
      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
          30
                              35
                                                  40
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      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
                                              55
                          50
      tca ggg gtc cca gac agg ttc agt agc agt gga tct ggg aca gat ttc
                                                                            288
      Ser Gly Val Pro Asp Arq Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
                                          70
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		110		-	Arg		115					120					
					cag Gln												480
	125		-			130	-		_		135				-	140	
					tat												528
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					tcg												576
	ASI	Ата	Leu	160	Ser	GIY	Asn	ser	165	GIU	ser	vaı	Thr	170	GIN	Asp	
					acc												624
	Ser	Lys	175	Ser	Thr	Tyr	Ser	Leu 180	Ser	Ser	Thr	Leu	Thr 185	Leu	Ser	Lys	
					aaa												672
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Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
                                  180
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      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
                              195
      Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
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                          -15
      gga tcc act gca gac atc gtg atg acc cag tct gca ctc tcc aat cca
                                                                             96
      Gly Ser Thr Ala Asp Ile Val Met Thr Gln Ser Ala Leu Ser Asn Pro
                  -1 1
                                                                            144
      gtc act cct gga gag ccg ggt tcc atc tcc tgc cgg tct agt aag agt
      Val Thr Pro Gly Glu Pro Gly Ser Ile Ser Cys Arg Ser Ser Lys Ser
                                  20
      ctc cta cat aqt aat qqc atc act tat ttg tat tgg tat ctg cag aaa
                                                                            192
      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
          30
                              35
      cca ggg cag tot cct cag ctg ctc atc tat cag atg tot aac aga gcc
                                                                            240
      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
                          50
                                                                            288
      tca qqq qtc cca qac aqq ttc aqt aqc aqt qqa tct ggq aca gat ttc
      Ser Gly Val Pro Asp Arg Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
                      65
      act ctc aag atc agc aga gtg gag gct gaa gat gtg gga gtt tat tac
                                                                            336
      Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
      tgt gct cag aac cta gag ctt ccg cgg acg ttc ggt cag ggc acc aag
                                                                            384
      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
                                  100
      ctt qaq atq aaa cqa act qtq gct gca cca tct gtc ttc atc ttc ccg
                                                                            432
      Leu Glu Met Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
          110
                              115
      cca tct gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg
                                                                            480
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
                          130
                                              135
      ctq aat aac ttc tat ccc aqa qaq qcc aaa qta cag tgg aag gtg gat
                                                                            528
      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
                      145
                                          150
                                                                            576
      aac qcc ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac
      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
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160
                                      165
                                                           170
      age aag gae age ace tae age ete age age ace etg aeg etg age aaa
      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
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                                  180
      gca gac tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag
      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
                              195
                                                   200
      qqc ctq aqc tcq ccc qtc aca aaq agc ttc aac agg gga gag tgt tag
      Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
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                                              -10
      Gly Ser Thr Ala Asp Ile Val Met Thr Gln Ser Ala Leu Ser Asn Pro
                  -1 1
      Val Thr Pro Gly Glu Pro Gly Ser Ile Ser Cys Arg Ser Ser Lys Ser
                                  20
      Leu Leu His Ser Asn Gly Ile Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys
                              35
                                                   40
      Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr Gln Met Ser Asn Arg Ala
                                              55
      Ser Gly Val Pro Asp Arg Phe Ser Ser Ser Gly Ser Gly Thr Asp Phe
                                          70
      Thr Leu Lys Ile Ser Arq Val Glu Ala Glu Asp Val Gly Val Tyr Tyr
                                      85
      Cys Ala Gln Asn Leu Glu Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys
                                  100
                                                       105
      Leu Glu Met Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
                              115
      Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
                          130
                                              135
      Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
                                          150
                      145
      Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
                                      165
      Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
                                  180
                                                       185
      Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
                              195
                                                   200
      Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
                          210
                                              215
      205
<210> 46
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      actettacta gaccggcagg agatggaacc tgactetece agagtgactg gattggagag
      tggagactgg gtcatcacga tgtct
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672

720

<220> <221>	. 85 - DNA - Homo Sapiens - misc_feature												
	$^{ m P2}$ Oligo Human Engineered ING-1 with proline oligos 47 actictacta gaccggcagg agatggaacc tgactctcca ggagtgactg gattggagag tgcagactgg gtcatcacga tgtct	60 <b>85</b>											
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	actottacta gaccggcagg agatggaacc cggctotocc agagtgactg gattggagag tgcagactgg gtcatcacga tgtot	85											
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	50 85	65											
	misc_feature P1P3 Oligo Human Engineered ING-1 with proline oligos 50												
	actottacta gacoggoagg agatggaaco oggototoco agagtgactg gattggagag tggagactgg gtoatcacga tgtot	60 85											
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	misc_feature P2P3 Oligo Human Engineered ING-1 with proline oligos 51 actcttacta gaccggcagg agatggaacc cggctctcca ggagtgactg gattggagag tgcagactgg gtcatcacga tgtct	60 <b>8</b> 5											

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<213> Homo Sapiens
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                                                                             19
      cttactagac cggcaggag
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                                           10
      acg gcg act ttt gcc gca gct cag gaa gaa tgt gtc tgt gaa aac tac
                                                                             96
      Thr Ala Thr Phe Ala Ala Ala Gln Glu Glu Cys Val Cys Glu Asn Tyr
                                      25
      aag ctg gcc gta aac tgc ttt gtg aat aat cgt caa tgc cag tgt
                                                                            144
      Lys Leu Ala Val Asn Cys Phe Val Asn Asn Asn Arg Gln Cys Gln Cys
                                  40
      act toa gtt ggt gca caa aat act gtc att tgc tca aag ctg gct gcc
                                                                            192
      Thr Ser Val Glv Ala Gln Asn Thr Val Ile Cys Ser Lys Leu Ala Ala
      aaa tgt ttg gtg atg aag gca gaa atg aat ggc tca aaa ctt ggg aga
                                                                            240
      Lys Cys Leu Val Met Lys Ala Glu Met Asn Gly Ser Lys Leu Gly Arg
                          70
      aga gca aaa cct gaa ggg gcc ctc cag aac aat gat ggg ctt tat gat
                                                                            288
      Arg Ala Lys Pro Glu Gly Ala Leu Gln Asn Asn Asp Gly Leu Tyr Asp
                                          90
                                                               95
      cet gae tge gat gag age ggg ete ttt aag gee aag eag tge aac gge
                                                                            336
      Pro Asp Cys Asp Glu Ser Gly Leu Phe Lys Ala Lys Gln Cys Asn Gly
                  100
                                      105
      acc tcc acg tgc tgg tgt gtg aac act gct ggg gtc aga aga aca gac
                                                                            384
      Thr Ser Thr Cys Trp Cys Val Asn Thr Ala Gly Val Arg Arg Thr Asp
                                  120
                                                      125
      aag gac act gaa ata acc tgc tct gag cga gtg aga acc tac tgg atc
                                                                            432
      Lys Asp Thr Glu Ile Thr Cys Ser Glu Arg Val Arg Thr Tyr Trp Ile
          130
                              135
      atc att gaa cta aaa cac aaa gca aga gaa aaa cct tat gat agt aaa
                                                                            480
      Ile Ile Glu Leu Lys His Lys Ala Arq Glu Lys Pro Tyr Asp Ser Lys
                          150
                                              155
      agt ttg cgg act gca ctt cag aag gag atc aca acg cgt tat caa ctg
                                                                            528
      Ser Leu Arg Thr Ala Leu Gln Lys Glu Ile Thr Thr Arg Tyr Gln Leu
                      165
                                          170
      gat cca aaa ttt atc acg agt att ttg tat gag aat aat gtt atc act
                                                                            576
      Asp Pro Lys Phe Ile Thr Ser Ile Leu Tyr Glu Asn Asn Val Ile Thr
                  180
                                      185
      att gat ctg gtt caa aat tot tot caa aaa act cag aat gat gtg gac
                                                                            624
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Ile Asp Leu Val Gln Asn Ser Ser Gln Lys Thr Gln Asn Asp Val Asp
              195
                                  200
      ata gct gat gtg gct tat tat ttt gaa aaa gat gtt aaa ggt gaa tcc
                                                                            672
      Ile Ala Asp Val Ala Tyr Tyr Phe Glu Lys Asp Val Lys Gly Glu Ser
                              215
                                                  220
                                                                            720
      ttg ttt cat tct aag aaa atg gac ctg aca gta aat ggg gaa caa ctg
      Leu Phe His Ser Lys Lys Met Asp Leu Thr Val Asn Gly Glu Gln Leu
      225
                          230
                                              235
      gat ctq gat cct gqt caa act tta att tat tat gtt gat gaa aaa gca
                                                                            768
      Asp Leu Asp Pro Gly Gln Thr Leu Ile Tyr Tyr Val Asp Glu Lys Ala
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                                                                           798
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      Lys Leu Ala Val Asn Cys Phe Val Asn Asn Asn Arg Gln Cys Gln Cys
                                  40
      Thr Ser Val Gly Ala Gln Asn Thr Val Ile Cys Ser Lys Leu Ala Ala
      Lys Cys Leu Val Met Lys Ala Glu Met Asn Gly Ser Lys Leu Gly Arg
                          70
                                              75
      Arg Ala Lvs Pro Glu Gly Ala Leu Gln Asn Asn Asp Gly Leu Tyr Asp
                                          90
      Pro Asp Cys Asp Glu Ser Gly Leu Phe Lys Ala Lys Gln Cys Asn Gly
                  100
                                      105
      Thr Ser Thr Cys Trp Cys Val Asn Thr Ala Gly Val Arg Arg Thr Asp
                                  120
                                                      125
      Lys Asp Thr Glu Ile Thr Cys Ser Glu Arg Val Arg Thr Tyr Trp Ile
                              135
      Ile Ile Glu Leu Lys His Lys Ala Arg Glu Lys Pro Tyr Asp Ser Lys
                          150
                                              155
      Ser Leu Arg Thr Ala Leu Gln Lys Glu Ile Thr Thr Arg Tyr Gln Leu
                                          170
      Asp Pro Lys Phe Ile Thr Ser Ile Leu Tyr Glu Asn Asn Val Ile Thr
                                      185
                  180
      Ile Asp Leu Val Gln Asn Ser Ser Gln Lys Thr Gln Asn Asp Val Asp
                                  200
                                                      205
      Ile Ala Asp Val Ala Tyr Tyr Phe Glu Lys Asp Val Lys Gly Glu Ser
                              215
      Leu Phe His Ser Lys Lys Met Asp Leu Thr Val Asn Gly Glu Gln Leu
                                              235
                          230
      Asp Leu Asp Pro Gly Gln Thr Leu Ile Tyr Tyr Val Asp Glu Lys Ala
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      Pro Glu Phe Ser Met Gln Gly Leu Lys
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                                                                           96
     Thr Ala Thr Phe Ala Ala Ala Glu Glu Cys Val Cys Glu Asn Tyr
                             -1 1
     aag ctg gcc gta aac tgc ttt gtg aat aat aat cgt caa tgc cag tgt
                                                                          144
     Lys Leu Ala Val Asn Cys Phe Val Asn Asn Asn Arg Gln Cys Gln Cys
                         15
                                                                 25
                                                                          192
     act toa gtt ggt gca caa aat act gtc att tgc toa aag ctg gct gcc
     Thr Ser Val Gly Ala Gln Asn Thr Val Ile Cys Ser Lys Leu Ala Ala
                                         35
     aaa tgt ttg gtg atg aag gca gaa atg aat ggc tca aaa ctt ggg aga
                                                                          240
     Lys Cys Leu Val Met Lys Ala Glu Met Asn Gly Ser Lys Leu Gly Arg
                 45
                                     50
     aga gca aaa cct gaa ggg gcc ctc cag aac aat gat ggg ctt tat gat
                                                                          288
     Arg Ala Lys Pro Glu Gly Ala Leu Gln Asn Asn Asp Gly Leu Tyr Asp
              60
                                 65
      cct gac tgc gat gag agc ggg ctc ttt aag gcc aag cag tgc aac ggc
                                                                          336
      Pro Asp Cys Asp Glu Ser Gly Leu Phe Lys Ala Lys Gln Cys Asn Gly
                                                                          384
      acc tcc acg tgc tgg tgt gtg aac act gct ggg gtc aga aga aca gac
      Thr Ser Thr Cys Trp Cys Val Asn Thr Ala Gly Val Arg Arg Thr Asp
                          95
                                             100
      aag gac act gaa ata acc tgc tct gag cga gtg aga acc tac tgg atc
                                                                          432
      Lys Asp Thr Glu Ile Thr Cys Ser Glu Arg Val Arg Thr Tyr Trp Ile
                                         115
                      110
      atc att gaa cta aaa cac aaa gca aga gaa aaa cct tat gat agt aaa
                                                                          480
      Ile Ile Glu Leu Lys His Lys Ala Arg Glu Lys Pro Tyr Asp Ser Lys
                 125
                                     130
      agt ttg cgg act gca ctt cag aag gag atc aca acg cgt tat caa ctg
                                                                          528
      Ser Leu Arg Thr Ala Leu Gln Lys Glu Ile Thr Thr Arg Tyr Gln Leu
              140
                                 145
      gat cca aaa ttt atc acg agt att ttg tat gag aat aat gtt atc act
                                                                          576
      Asp Pro Lys Phe Ile Thr Ser Ile Leu Tyr Glu Asn Asn Val Ile Thr
                              160
      att gat ctg gtt caa aat tct tct caa aaa act cag aat gat gtg gac
                                                                          624
      Ile Asp Leu Val Gln Asn Ser Ser Gln Lys Thr Gln Asn Asp Val Asp
                          175
                                             180
      ata gct gat gtg gct tat tat ttt gaa aaa gat gtt aaa ggt gaa tcc
                                                                          672
      Ile Ala Asp Val Ala Tyr Tyr Phe Glu Lys Asp Val Lys Gly Glu Ser
                                         195
                      190
      ttg ttt cat tct aag aaa atg gac ctg aca gta aat ggg gaa caa ctg
                                                                          720
      Leu Phe His Ser Lys Lys Met Asp Leu Thr Val Asn Gly Glu Gln Leu
                  205
                                     210
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768
      gat ctg gat cct ggt caa act tta att tat tat gtt gat gaa aaa gca
      Asp Leu Asp Pro Gly Gln Thr Leu Ile Tyr Tyr Val Asp Glu Lys Ala
                                  225
                                                      230
      cct qaa ttc tca atg cag ggt cta aaa gct ggt gtt att gct gtt att
                                                                            816
      Pro Glu Phe Ser Met Gln Gly Leu Lys Ala Gly Val Ile Ala Val Ile
                              240
      gtg gtt gtg gtg ata gca gtt gtt gct gga att gtt gtg ctg gtt att
                                                                            864
      Val Val Val Ile Ala Val Val Ala Gly Ile Val Val Leu Val Ile
                          255
                                              260
                                                                            912
      tcc aga aag aag aga atg gca aag tat gag aag gct gag ata aag gag
      Ser Arg Lys Lys Arg Met Ala Lys Tyr Glu Lys Ala Glu Ile Lys Glu
                      270
                                          275
                                                                           945
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      Met Gly Glu Met His Arg Glu Leu Asn Ala
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                              -1 1
      Lys Leu Ala Val Asn Cys Phe Val Asn Asn Asn Arg Gln Cys Gln Cys
      Thr Ser Val Gly Ala Gln Asn Thr Val Ile Cys Ser Lys Leu Ala Ala
                                          35
      Lys Cys Leu Val Met Lys Ala Glu Met Asn Gly Ser Lys Leu Gly Arg
                                      50
      Arg Ala Lys Pro Glu Gly Ala Leu Gln Asn Asn Asp Gly Leu Tyr Asp
                                  65
      Pro Asp Cys Asp Glu Ser Gly Leu Phe Lys Ala Lys Gln Cys Asn Gly
      Thr Ser Thr Cys Trp Cys Val Asn Thr Ala Gly Val Arg Arg Thr Asp
                          95
                                              100
      Lys Asp Thr Glu Ile Thr Cys Ser Glu Arg Val Arg Thr Tyr Trp Ile
                      110
                                          115
      Ile Ile Glu Leu Lys His Lys Ala Arg Glu Lys Pro Tyr Asp Ser Lys
                                      130
      Ser Leu Arg Thr Ala Leu Gln Lys Glu Ile Thr Thr Arg Tyr Gln Leu
                                  145
      Asp Pro Lys Phe Ile Thr Ser Ile Leu Tyr Glu Asn Asn Val Ile Thr
                              160
                                                  165
      Ile Asp Leu Val Gln Asn Ser Ser Gln Lys Thr Gln Asn Asp Val Asp
                          175
                                              180
      Ile Ala Asp Val Ala Tyr Tyr Phe Glu Lys Asp Val Lys Gly Glu Ser
                                          195
      Leu Phe His Ser Lys Lys Met Asp Leu Thr Val Asn Gly Glu Gln Leu
                                      210
      Asp Leu Asp Pro Gly Gln Thr Leu Ile Tyr Tyr Val Asp Glu Lys Ala
                                  225
      Pro Glu Phe Ser Met Gln Gly Leu Lys Ala Gly Val Ile Ala Val Ile
                              240
                                                  245
      Val Val Val Ile Ala Val Val Ala Gly Ile Val Val Leu Val Ile
                          255
                                              260
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270
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      Met Gly Glu Met His Arg Glu Leu Asn Ala
                  285
                                       290
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<211> 31
<212> DNA
<213> Homo sapiens
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<221> misc_feature
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<223> Ep-CAM Reverse Primer (for full-length Ep-CAM): EC-3

gtatecettg agttacgtat tgagetegtt

Ser Arg Lys Lys Arg Met Ala Lys Tyr Glu Lys Ala Glu Ile Lys Glu